

DISCUSSORS ON PAPERS ON ROAD & HIGHWAY CONSTRUCTION

(Papers published in Vol. 46. No. 4.)

1. **Shri M. K. Chatterjee**, Director, Road & Building Research Institute, West Bengal.

It is imperative to provide dense asphalt base and surface course of sufficient thickness for the city roads faced with water logging problem, sub bases of lean concrete or cement soil should prevent seepage.

Equivalency factor should not exceed 1.5 in case of asphalt bound base. The overlay thickness prescribed earlier by I.R.C. is now under review by the new committee. There is scope for adopting modern methods of designing as also for using modern machinery for construction and quality control.

2. **Shri S. Gupta**, Executive Engineer, P. W. D. North Calcutta Divn, Calcutta, briefly discussed the points of sub-soil drainage, details of overlays and use of materials locally available.

3. **Shri D. P. Chakrabarti**, 57, Jatindra Mohan Avenue, Calcutta-5

There is no specific sub-base course in most of the Calcutta roads. As such design is to be based on subgrade strength mainly viz. CBR, Plate Bearing Test, determinations of Elastic Limit etc.

Distress and damages to Calcutta roads require detail investigations as each year certain layer of B. M. is laid on roads without any good result. Bituminous macadam is the only probable solution for the overlay work of flexible pavements.

For a distressed road the span of investigation spots may be increased or decreased according to the condition of the road.

4. **Shri P. K. Das**, Survey Divn II, P. W. (Roads), Bhabani Bhavan, Calcutta

For rectification of distressed road by overlay with W. B. M. in a congested city like Calcutta appears impractical. Bituminous macadam is the only solution for it,

5. **Shri Satyabrata Sen**, H I T, Howrah Specification for slag to be used as road material in base course and surface courses may be mentioned.

6. **Shri A. W Lalwaney**, Calcutta-25 and **Shri M. R. Bandopadhyay** Engineering Geology Division, G.S.I., Calcutta also participated in discussion.

7. **Dr. S. N. Mitra**, Dy-Director-in-charge, Indian Botanic Garden, Howrah

From beautification point of view, tree planting along highways is of great importance. For a good arboricultural planning along highways, the planner must be informed of the locations of service lines along highways so that those can be suitably incorporated in the arboricultural planning without affecting the beauty of the site.

8. **Shri B. K. Das**, Calcutta-31, **Ashutosh Bhattacharya**, Calcutta and **Lt Col. V. S. Ramachandan**, New Alipur also participated in discussion.

Paper By **Shri Siddhananda Chatterjee**

1. **Shri M. K. Chatterjee**, Director R. B. R. I., Calcutta-27

Shri Chatterjee discussed on replacement of soling, implication of heavier axle load as demonstrated in AASHO Road tests, compac-

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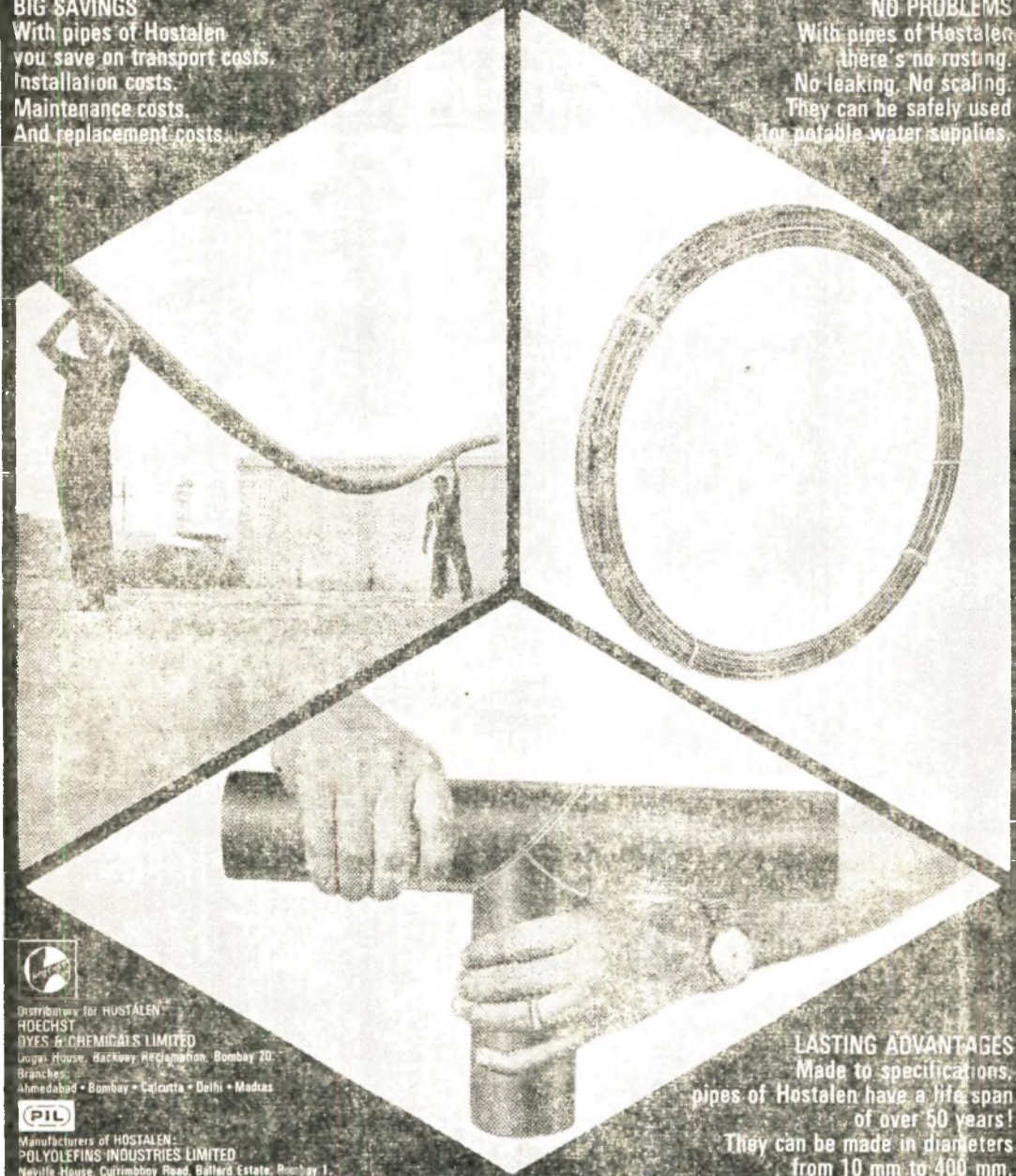
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tion of black cotton soil, compaction cost of built up spray grout and bituminous macadam surface dressing with precoated chips.

2. **Shri A. K. Roy**, Calcutta-5

Shri Roy briefly discussed on the necessity of evolving CBR charts suited to our country's condition, balance between employment of manual labour and equipments in road construction and traffic data.

3. **Shri R. K. Samanta**, P.W.D., West Bengal, Calcutta-14

Shri Samanta stressed on the aspect of quality control by S. Q. C.

4. **Shri B. K. Dam**, Calcutta-31 and **Shri S. C. Hazra**, Calcutta-13 presented a few points for discussion.

Paper By Shri Sisir Neogi

Shri M. K. Chatterjee, Director, R & B. R. I., Calcutta-27

Efficacy of vibrating roller in compacting sub-soil layers as amply demonstrated in U.K. not mentioned. I. R. C estimates our requirement of indigenously manufactured road machines (44 types) to be in the order of 20,000.

Paper By Shri R. Thillainayagam and Shri N. Raghavan

1. **Shri S. Mukherjee**, P. W. (Roads) Dept, W. Bengal, Calcutta-27

There is a minor error in the Fig. No 2—sand gravel cushion will be on the top of sand bitumen mix. (Page 203).

2. **Shri A. K. Roy**, P.W. (Special Roads) Dte, West Bengal

i. Until recently, pavements were designed on basis of rather "feelings" of requirements than on any data. One by his maturity of experience decided upon the total pavement thickness as well as its constituents. A break through, as pointed out by Sri S. Chatterjee in his paper, has now been

made by adopting scientific approach to such design. The current practice of pavement design is by following the California Bearing Ratio charts because they are the simplest process which deliver our required goods. These C.B.R. charts were developed by Road Research Laboratory, U. K. after extensive observations and tests in their country on a great number of roads which were serving satisfactorily and have also failed. These charts are accordingly purely empirical. Since these charts have been developed by observation and tests on various types of soil under different conditions, we have also adopted these charts for our designs. But it has not been tested whether those C.B.R. charts apply to our conditions fully. Climatic conditions, rainfall, traffic pattern and load factors differ considerably in our country from that of England. It is accordingly necessary that we should carry out the requisite elaborate tests to develop C.B.R. charts for our own conditions. In consideration of the vastness of our country and wide variance of conditions, the test is likely to be gigantic and investments appalling. But as we learn from the educative paper of Shri M. K. Guha, funds we shall sink about Rs. 10,000 crores in the near future construction of highways. The investment for accuracy of the design criteria will in perspective bear justified premium.

ii. In construction of highways on modern scientific processes that has long been practiced in foreign countries, employment of machineries in greater proportions is almost a corollary. Greater the engagement of mechanical equipments, less will be the involvement of manual labour. Manual labour is cheap in our country and are in abundance. More than that, we now

require to generate more and more employment potentials for our educated youths as well as illiterate labourers. It accordingly requires to strike a balance in choosing the fields in different phases of highway construction where manual labour should be engaged and which requires employment of machineries. It is suggested that the matter may be looked into for development of norms for it.

iii. The importance of traffic data in design of highways has been highlighted by Sri S. K. Roy and Sri A. K. Bandopadhyaya in their paper. Sadly enough, we have till now very little traffic data. While traffic counts are available for many of the roads covered by the Calcutta Metropolitan Development Authority, the picture in respect of rural roads is almost blank. Hardly any traffic

count enumerated scientifically is taken for our different roads on various regions. Consequentially, we have very little data to select the loading curve of the C.B.R. charts for our design purpose. Sometimes, even the justification of a road project may be questionable in absence of the traffic data. Setting up of an establishment for systematic and routine traffic studies in rural areas also is of utmost necessity.

iv. **Maintenance**—Capital outlay is gradually increasing. The riding surface indicates maintenance is not proper. The allocation of earning from the road users to a separate body like the Road Board who will finance and administrate the Highway system is likely to bring in greater funds and ensure better maintenance of the roads.

Vote of Thanks

By

T. K. Basu

Even all good things must end. Excepting for a lunch for the selected guests and members a drop scene is going to be put over the 2nd All India Conference on Engineering Materials and Equipment until we lift it for the 3rd Conference.

In the first place I thank the collaborators who have helped the Association of Engineers, India all along, in holding this Conference. These Associations and societies are the Institution of Public Health Engineers (India), Calcutta Metropolitan Development Authority, Geological Survey of India, Calcutta Metropolitan Water & Sanitation Authority, Govt. Depts. and Directorates namely, P. W. D., CMPO and Folk Entertainment and Informa-

tion sections of Govt. of West Bengal, Directorate of Inspection, Govt. of India. We especially acknowledge the help and cooperation extended by the management of Rabindra Sadan, Calcutta Information Centre, All India Radio, Press Information Bureau, West Bengal State Electricity Board, Calcutta Improvement Trust and Howrah Improvement Trust without whose help and cooperation this Conference would not have been a success. We also thank the local office of Ford Foundation and Prof. A. T. Row, Chief of the Foundation, in particular for their help and co-operation.

We acknowledge with a sense of deep admiration the co-operation extended by the artists of Bangladesh in arranging a cultural